Infrastructure Mitigation Strategies

		Priority (CHECK ONLY ONE)								
	Specific Mitigation Strategy	Existing Program	Very High	High	Moderate	Under Study	Not Applicable, Not Appropriate, or Not Cost Effective	Not Yet Considered	Responsible Agency or Department (Required if Existing Program, Very High, High, or Under Study)	Ordinance or Resolution # (if existing program), Estimated Cost and Possible Funding Agency (if high priority), Estimated Date of Completion (if study) OR Other Comments
INFR - a - Multihazard										
1)	Assess the vulnerability of critical facilities designated by lifeline operators to damage in natural disasters or security threats, including facilities owned outside of the Bay Area that can impact service delivery within the region. **Note** - Lifeline agencies, departments, and districts are those that operate transportation and utility facilities and networks.	X							City	Caltrans routinely inspects City bridges & submits reports
2)	Comply with State of California and federal requirements to assess the vulnerability of dams to damage from earthquakes, seiches, landslides, liquefaction, or security threats.						X			No dams in PH
3)	Encourage the cooperation of utility system providers and cities, counties, and other special districts to develop strong and effective mitigation strategies for infrastructure systems and facilities.					X			City	Implementation of ABAG's Multi-Jurisdiction hazards mitigation planning process
4)	Retrofit or replace critical lifeline facilities and/or their backup facilities that are shown to be vulnerable to damage in natural disasters.				X				City	Capital Improvement Program and process
5)	Support and encourage efforts of ***other*** (lifeline) agencies as they plan for and arrange financing for seismic retrofits and other disaster mitigation strategies. (For example, a city might pass a resolution in support of a transit agency's retrofit program.)	X							City	City Council considers other agencies strategies and programs on a case by case basis.
6)	Plan for speeding the repair and functional restoration of lifeline systems through stockpiling of shoring materials, temporary pumps, surface pipelines, portable hydrants, and other supplies, such as those available through the Water Agency Response Network (WARN).				X		X		City Fire, Sewer, Water Special District	County maintains City's traffic signal system; material & supplies for drainage system & bridge repairs are needed

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7)	Engage in, support, and/or encourage research by others on measures to further strengthen transportation, water, sewer, and power systems so that they are less vulnerable to damage in disasters.	X							City	Meetings with representatives of utility companies
8)	Pre-position emergency power generation capacity (or have rental/lease agreements for these generators) in critical buildings of cities, counties, and special districts to maintain continuity of government and services.					x			City	Police Dept has an emergency generator, one is being considered for the City Hall
9)	Have back-up emergency power available for critical intersection traffic lights.	X							City	Backup batteries are installed @ 9 critical intersections
10)	Develop unused or new pedestrian rights-of-way as walkways to serve as additional evacuation routes (such as fire roads in park lands).							X	City	None
11)	Coordinate with PG&E and others to investigate ways of minimizing the likelihood that power interruptions will adversely impact vulnerable communities, such as the disabled and the elderly.						X		PG&E	
12)	Encourage replacing aboveground electric and phone wires and other structures with underground facilities, and use the planning-approval process to ensure that all new phone and electrical utility lines are installed underground.	X							City	Chapter XVI PHMC, Potential PG & E's Rule 20A project & the development review process
13)	Coordinate with the State Division of Safety of Dams to ensure an adequate timeline for the maintenance and inspection of dams, as required of dam owners by State law.						X			No dams in PH
14)	Encourage communication between State OES, FEMA, and utilities related to emergencies occurring outside of the Bay Area that can affect service delivery in the region.							X	City	
15)	Ensure that transit operators, private ambulance companies, cities, and/or counties have mechanisms in place for medical transport during and after disasters that take into consideration the potential for reduced capabilities of roads following these same disasters.						X		County Sheriff's Office & CCCFPD	

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16)	Effectively utilize the Transportation Management Center (TMC), the staffing of which is provided by Caltrans, the CHP and MTC. The TMC is designed to maximize safety and efficiency throughout the highway system. It includes the Emergency Resource Center (ERC) which was created specifically for primary planning and procedural disaster management.							X		
INFR - b - Earthquakes										
1)	Expedite the funding and retrofit of seismically-deficient city- and county-owned bridges and road structures by working with Caltrans and other appropriate governmental agencies.	X							City	PH CIP & hazard elimination and transportation grant applications
2)	Establish a higher priority for funding seismic retrofit of existing transportation and infrastructure systems (such as BART) than for expansion of those systems.	X							City, Transpac & CCTA	Regular scheduled meetings
3)	Include “areas subject to high ground shaking, earthquake-induced ground failure, and surface fault rupture” in the list of criteria used for determining a replacement schedule for pipelines (along with importance, age, type of construction material, size, condition, and maintenance or repair history).						X		EBMUD, CCWD & CCCSD	
4)	Install specially-engineered pipelines in areas subject to faulting, liquefaction, earthquake-induced landsliding, or other earthquake hazard.						X		EBMUD, CCWD & CCCSD	
5)	Replace or retrofit water-retention structures that are determined to be structurally deficient.						X		EBMUD, CCWD & CCCSD	
6)	Install portable facilities (such as hoses, pumps, emergency generators, or other equipment) to allow pipelines to bypass failure zones such as fault rupture areas, areas of liquefaction, and other ground failure areas (using a priority scheme if funds are not available for installation at all needed locations).						X		EBMUD CCWD	
7)	Install earthquake-resistant connections when pipes enter and exit bridges.						X	X	City EBMUD, CCWD & CCCSD	

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8)	Comply with all applicable building and fire codes, as well as other regulations (such as state requirements for fault, landslide, and liquefaction investigations in particular mapped areas) when constructing or significantly remodeling infrastructure facilities.	X							City & CCCFPD	PHMC, 2001 CBC & Fire Code & City retaining geotechnical consultants to review construction plans
9)	Clarify to workers in critical facilities and emergency personnel, as well as to elected officials and the public, the extent to which the facilities are expected to perform only at a life safety level (allowing for the safe evacuation of personnel) or are expected to remain functional following an earthquake.				X				City	Countywide NEMS
10)	Examine the feasibility of developing a water-borne transportation "system" – comprised mainly of relatively inexpensive barges – across the Bay for use in the event of major earthquakes. Implementation of such a system could prove extremely useful in the event of structural failure of either the road-bridge systems or BART and might serve as an adjunct to existing transportation system elements in the movement of large numbers of people and/or goods.						X			
INFR - c - Wildfire										
1)	Ensure a reliable source of water for fire suppression (meeting acceptable standards for minimum volume and duration of flow) for existing and new development.	X							City, Martinez, CCWD, CCCFPD, EBMUD	Fire Codes & the development review process
2)	Develop a coordinated approach between fire jurisdictions and water supply agencies to identify needed improvements to the water distribution system, initially focusing on areas of highest wildfire hazard.						X		CCCFPD, CCWD & EBMUD	Fire Codes
3)	Develop a defensible space vegetation program that includes the clearing or thinning of (a) non-fire resistive vegetation within 30 feet of access and evacuation roads and routes to critical facilities, or (b) all non-native species (such as eucalyptus and pine, but not necessarily oaks) within 30 feet of access and evacuation roads and routes to critical facilities.	X					X		City PHR & PD, CCCFPD	Public Services Center maintains roadside & its open space areas.

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4)	Ensure all dead-end segments of public roads in high hazard areas have at least a "T" intersection turn-around sufficient for typical wildland fire equipment.	X							City & CCCFPD	PHMC, Fire Codes & the development review process
5)	Enforce minimum road width of 20 feet with an additional 10-foot clearance on each shoulder on ***all*** driveways and road segments greater than 50 feet in length in wildfire hazard areas.	X							City & CCCFPD	PHMC, Fire Codes & the development review process
6)	Require that development in high fire hazard areas provide adequate access roads (with width and vertical clearance that meet the minimum standards of the *Fire Code* or relevant local ordinance), onsite fire protection systems, evacuation signage, and fire breaks.	X							City, CCCFPD & PH R & PD	PHMC, Fire Codes & the development review process
7)	Ensure adequate fire equipment road or fire road access to developed and open space areas.	X							City, CCCFPD & PH R & PD	PHMC, Fire Codes & the development review process
8)	Maintain fire roads and/or public right-of-way roads and keep them passable at all times.	X							City, CCCFPD & PH R & PD	Road maintenace & CIP programs
INFR - d - Flooding										
1)	Conduct a watershed analysis of runoff and drainage systems to predict areas of insufficient capacity in the storm drain and natural creek system.	X							City, County Flood Control District, FEMA & ACOE	FIRM complete 12/2003, Corp's Feasibility Study will be completed in March 2007
2)	Develop procedures for performing a watershed analysis to look at the impact of development on flooding potential downstream, including communities outside of the jurisdiction of proposed projects.	X							City, County Flood Control District, & ACOE	PHMC, FCD Codes, Development design review process and Corps hydrology & hydraulic computer models
3)	Conduct a watershed analysis at least once every three years.						X		City & CCCFCD	Analysis has been completed & watershed area is built out.
4)	Assist, support, and/or encourage the U.S. Army Corp of Engineers, various Flood Control and Water Conservation Districts, and other responsible agencies to locate and maintain funding for the development of flood control projects that have high cost-benefit ratios (such as through the writing of letters of support and/or passing resolutions in support of these efforts).	X							City, Flood Control District, FEMA & ACOE	The Southern PH Ad Hoc Task Force supports the ACOE Feasibility Study Phases I & II

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5)	Pursue funding for the design and construction of storm drainage projects to protect vulnerable properties, including property acquisitions, upstream storage such as detention basins, and channel widening with the associated right-of-way acquisitions, relocations, and environmental mitigations.			X					City, Flood Control District, FEMA & ACOE	Seeking federal funds for flood protection projects - cost $40 M +
6)	Continue to repair and make structural improvements to storm drains, pipelines, and/or channels to enable them to perform to their design capacity in handling water flows as part of regular maintenance activities.	X							City, Flood Control District	City & CCCFCD Capital Improvement Programs
7)	Continue maintenance efforts to keep storm drains and creeks free of obstructions, while retaining vegetation in the channel (as appropriate), to allow for the free flow of water.	X							City & CCCFCD	CCCFCD Codes, PHMC, and annual storm drain & creek clean up programs
8)	Enforce provisions under creek protection, stormwater management, and discharge control ordinances designed to keep watercourses free of obstructions and to protect drainage facilities to confirm with the Regional Water Quality Control Board's Best Management Practices.	X							City & CCCFCD	CCCFCD Codes & PHMC. Creek Cleanup & NPDES Programs
9)	Develop an approach and locations for various watercourse bank protection strategies, including for example, (1) an assessment of banks to inventory areas that appear prone to failure, (2) bank stabilization, including installation of rip rap, (3) stream bed depth management using dredging, and (4) removal of out-of-date coffer dams in rivers and tributary streams.				X				City & CCCFCD	Annual inspection program identifies problem areas. Projects are incorporated into the Capital Improvement Program.
10)	Use reservoir sediment removal as one way to increase storage for both flood control and water supply.						X	X	City EBMUD & CCCSD	Water districts owns the reservoirs
11)	Elevate critical bridges affected by flooding to increase stream flow and maintain critical access and egress routes.			X					City & CCCFCD	Problem bridges identified in the ACOE's Feasibility Study - I & CIP project review process

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12)	Provide a mechanism to expedite the repair or replacement of levees that are vulnerable to collapse from earthquake-induced shaking or liquefaction, rodents, and other concerns, particularly those protecting critical infrastructure.						X		CCCFCD	
13)	Ensure that utility systems in new developments are constructed in ways that reduce or eliminate flood damage.	X							City, CCCFCD & Utility Districts	CEQA, General Plan & the development design review process
14)	Determine whether or not wastewater treatment plants are protected from floods, and if not, investigate the use of flood-control berms to not only protect from stream or river flooding, but also increasing plant security.						X		CCCFCD & CCCSD	When completed the Army Corps Feasibility Study will be provided to the CCCSD
15)	Work cooperatively with water agencies, flood control districts, Caltrans, and local transportation agencies to determine appropriate performance criteria for watershed analysis.					X			Caltrans, CCCFCD & ACOE	ACOE's Feasibility Study - I & II
16)	Work for better cooperation among the patchwork of agencies managing flood control issues.	X							City, CCCFCD, ACOE & FEMA	Southern PH Ad Hoc Task Force is working with the community & agencies
17)	Work cooperatively with upstream communities to monitor creek and watercourse flows to predict potential for flooding downstream.	X							City, CCCFCD, & ACOE	Southern PH Ad Hoc Task Force is working with the community. When completed, the Feasibility Study will be provided to the agencies
INFR - e - Landslides										
1)	Include “areas subject to ground failure” in the list of criteria used for determining a replacement schedule (along with importance, age, type of construction material, size, condition, and maintenance or repair history) for pipelines.						X	X	City Utility Companies	City Storm Drain System not yet evaluated
2)	Establish requirements in zoning ordinances to address hillside development constraints in areas of steep slopes that are likely to lead to excessive road maintenance or where roads will be difficult to maintain during winter storms due to landsliding.	X							City	General Plan, CEQA, PW Standards
INFR - f - Building Reoccupancy										

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1)	Ensure that critical buildings owned or leased by special districts or private utility companies participate in a program similar to San Francisco's Building Occupancy Resumption Program (BORP). The BORP program permits owners of buildings to hire qualified structural engineers[1] to create facility-specific post-disaster inspection plans and allows these engineers to become automatically deputized as City/County inspectors for these buildings in the event of an earthquake or other disaster. This program allows rapid reoccupancy of the buildings. **Note** - A qualified structural engineer is a California licensed structural engineer with relevant experience.							X	City	
INFR - g - Public Education										
1)	Provide materials to the public related to planning for power outages.							X	PG&E	Articles could be published in the Outlook newsletter or on PH's website
2)	Provide materials to the public related to family and personal planning for delays due to traffic or road closures.	X							City	When city roads are underconstruction, advance notices are published in the newspaper and detour signs are place on the roads & PH's website
3)	Provide materials to the public related to coping with reductions in water supply or contamination of that supply.							X	EBMUD & CCWD	Articles could be published in the Outlook newsletter or on PH's website
4)	Provide materials to the public related to coping with disrupted storm drains, sewage lines, and wastewater treatment.	X X							City - Storm Drains CCCSD sewer lines	When city roads are underconstruction, advance notices are published in PH's website and detour signs are place on the roads
5)	Facilitate and/or coordinate the distribution of materials that are prepared by others, such as by placing materials in city or utility newsletters, or on community access channels, as appropriate.	X							City - Storm Drains CCCSD sewer lines	City's Outlook newsletter, web site & library